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Division of Mycology and Disease Survey

Volume XIX Number 6

May 1, 1935

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

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TRANSLATIONS OF PLANT DISEASE PUBLICATIONS

G. F. Gravatt

During the past ten years plant pathologists have had increasing difficulty in keeping up with the plant-disease literature of the world. The increasing number of publications in Russian, Japanese, Scandinavian, Italian, Czech, and Dutch have not been available to the average research worker, who is usually familiar only with French and German. Often he can not read even these two languages fluently enough to translate them without excessive use of dictionaries. That this problem is going to be more serious in the future is shown by a statement in a recent book, "Agricultural Science in the U.S.S.R., 1934," that the number of agricultural research workers in Russia has increased from less than 500 in 1912 to nearly 6,000 with 700 scientific apprentices who are recent graduates of agricultural colleges attached to the research stations but not yet counted as research workers. With the development of Manchuria, it is probable that the number of articles on the plant diseases of that region, which has essentially the same crops and climate as many parts of this country, will also increase.

Abstract journals do not solve the problem, because they necessarily have to omit many details that a plant pathologist needs to know. To an increasing extent, pertinent foreign literature will be inadequately considered or ignored unless some plan is devised to make it more available.

During the past two years the Division of Forest Pathology, Bureau of Plant Industry, with the aid of the Civil Works Administration and the Federal Emergency Relief Administration, has translated over 300 articles primarily on forest diseases. As fast as these translations are edited and copied, they are distributed to the branches of that Division; and one copy is filed in the Department of Agriculture Library at Washington, for loan to other workers in the Department and at experiment stations and universities. These translations are listed in "Plant Science Literature," issued by the Bureau of Plant Industry Library.

Plant-disease publications of the world would be much more available to workers in this country and Canada, if all the agencies interested in plant-disease research would cooperate in building up a file of translations. It is suggested that all such agencies deposit in the Department of Agriculture Library copies of the translations they have already made. A considerable number of translations have been made by the splendidly qualified foreign students studying in the plant pathology departments of the universities, but few of these are now available to other workers. In some cases the same article has been translated independently by several different scientists. Interested agencies that have no translations to contribute at present could cooperate by copying some of the translations already made but not yet copied and by translating articles in the future. Some agencies might be in a position to mimeograph translations of general interest for distribution to each cooperating agent. It may be possible in some places to secure help from the relief agencies by the assignment to this work of translators who are on their rolls. After the available translations have been sent to the Department of Agriculture Library it is planned to get out a mimeographed list of titles and citations, so that plant pathologists at cooperating institutions will know what is available.

EXPERIMENTAL FORECAST OF THE INCIDENCE OF BACTERIAL WILT OF CORN IN 1935

Neil E. Stevens

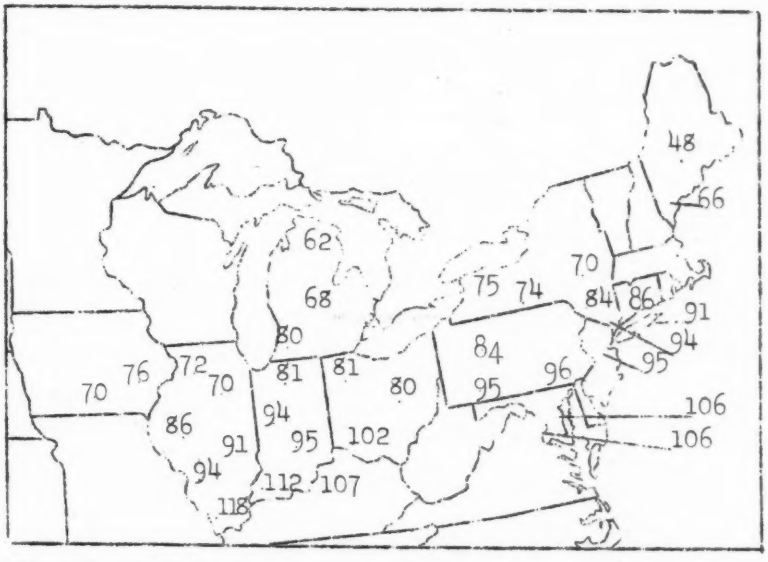


Fig. 2. Winter temperature indices for 1934 - 1935

An apparent correlation between winter temperatures and the distribution of Stewart's disease of corn was pointed out in the October 1, 1934 number of the Plant Disease Reporter. At that time it was suggested that if the relation was actually constant and significant, it should be possible in early spring to forecast the disease incidence for the coming summer on the basis of a simple computation of winter temperatures, accepting as a working hypothesis the idea that the disease would usually be of little importance in the northeastern United States following a winter index below 90 and usually present in destructive amounts following a winter index above 100.

The temperature indices of the past winter for the various stations used in the earlier publication, are given in Figure 2. Comparison of these figures with those for the preceding years and with normal figures might suggest that on the whole any considerable increase in the amount of disease over last season is unlikely. (See also in this connection current volume of the Plant Disease Reporter, pages 32 and 331).

It is, of course, unnecessary to remind readers that this is purely an experimental forecast, not supported by controlled evidence or even by experience. It may well be that the correlation is merely between winter temperatures and the time the disease appears in the spring. This item is released at this time for the information of interested pathologists, purely as an experiment and in order to test the validity of an interesting hypothesis.

Erratum: Those who are particularly interested in this matter and have copies of the Plant Disease Reporter for October 1, 1934 or reprints therefrom are asked to change in Figure 7 the index for Lansing, Michigan from 78 to 69, winter of 1933-34.

FUNGI IN IMPORTED CORN

N. E. Stevens and P. E. Hoppe

Advantage was taken of the unusual volume of corn imported into the United States during the winter of 1934 - 1935 to secure some added information regarding the distribution of corn ear rot fungi. In response to a request, the grain supervisors at various ports of entry sent samples of corn from a number of cargoes received from various countries to the Washington laboratory. In all, about 70 samples were received and, so far as practicable, platings were made to determine the fungi present in the kernels, using the methods described in the Reporter (Vol. 18, No. 15, pp. 186 - 189, Dec. 1, 1934) by Holbert and Hoppe. The number of samples was too few to make possible any quantitative measurement of the relative abundance of the various fungi. Moreover, some of the lots, especially from South America, had evidently heated somewhat in transit and the fungi which developed were predominantly common molds. Results are given in the following table,

Table 5. Corn ear rot fungi found in corn imported into the United States, 1934 - 35

Country of origin	Diplodia zeae	Gibberella	Fusarium
Argentina	27	2	45
Manchuria	43	4	18
Mexico	116	6	11
Uruguay	5		6

the numbers indicating merely the number of kernels from which the indicated fungus developed. It is needless to call attention to the fact that these fungi are common and widely distributed in the United States. That this is the first time that some of these fungi were reported from the country indicated is further proof of the very fragmentary nature of our knowledge of the distribution of fungi, even on the most important cultivated crops.

INCIDENCE OF EAR ROTS IN THE 1916-1933 CORN CROPS

Neil E. Stevens

That losses from ear rots vary greatly from year to year is a matter of common knowledge. As in most similar cases, the conspicuously bad crops, like that of 1917, are more generally remembered than the conspicuously good ones, and the minor fluctuations in quality are not recorded, or at least not published. In an endeavor to secure somewhat more detailed information on the variation in losses from year to year, as well as on the geographic distribution of corn ear rots, examination has been made of the reports of inspections by licensed inspectors of shelled corn receipts for the period 1917 to 1934 at the following terminals: Cedar Rapids, Burlington, Clinton, Davenport, Des Moines, Keokuk, Sioux City, Iowa; Cairo, Peoria, Decatur, East St. Louis, Illinois; Cincinnati, Toledo, Mansfield, Ohio; Denver, Colorado; Fort Worth, Texas; Indianapolis, Indiana; Kansas City, Salina, Topeka, Atchison, Wichita, Hutchinson,Kansas; Kansas City, St. Joseph, St. Louis, Missouri; Louisville, Henderson, Kentucky; Omaha, Columbus, Lincoln, Nebraska.

The figures presented in the maps and curves published herewith are based on tabulations of licensed inspectors of shelled corn receipts by grades in terms of carloads for the month of June, for the years 1917 to 1934, inclusive, which were prepared by the Grains Division, Bureau of Agricultural Economics, U. S. Department of Agriculture

Reports of Licensed Inspections as a Source of Information Regarding Ear Rots

As a source of information on the incidence and distribution of corn ear rots, the records of licensed inspections have certain obvious limitations and certain decided advantages. As they deal only with corn which reaches terminal markets, they fail to reflect the variations in amount of corn so badly diseased as never to leave the farm. Also, since in the figures available the source of the corn is not known, it is necessary to leave out of consideration such markets as Chicago, Buffalo, and Milwaukee, which regularly receive shipments from a wide area. There is of course no certainty that all the corn inspected at the markets from which figures are included was grown in that particular region but experienced observers agree that the overwhelming proportion of it was grown in the general vicinity or somewhat west of the various terminals indicated.

Among the advantages which such reports offer as a source of plant disease information some of the most important are the relatively large numbers of individual reports, their high degree of uniformity over a large area and a series of years, and their entire detachment from the prejudices which might result from intensive study of certain diseases or areas.

Each figure on the maps included herewith (Figs. 5 to 40) represents at least fifty cars of corn inspected at that particular market in June of the year indicated. In a number of cities over a thousand cars were inspected. This gives a more adequate picture of the corn crop than is at present obtainable in any other way.

The accuracy and uniformity of the licensed inspections is of a very high order. The Federal corn grades were established in 1916 and during the period covered by this summary have not changed in any way which would affect these figures materially. The actual inspection work is done by adequately trained and experienced inspectors licensed by the Secretary of Agriculture. The uniformity of the inspections over the entire country and over the whole period of years was maintained by the Federal Grain Supervision service, by which organization methods of adequate sampling and grading have been carefully worked out and standardized.

Ear Rots as Related to Numerical Grades

The maximum limit of damaged kernels permissible for each numerical grade during the period here reviewed was as follows:

Grade No.	Maximum limit of total damage per cent
1	2
2	4
3	6
4	8
5	10
6	15

The recently ordered changes in these limits went into effect on September 1, 1934 and thus do not influence the figures here included.

Those more familiar with market conditions are agreed that the factor total damage is so largely made up of diseased and rotten kernels that the figures for T. D. give a very accurate measure of the amount of disease in the inspected grain. Moreover, the experience of many years indicates that by June the corn is so fully dried out that both test weight per bushel and per cent moisture have become unimportant as grading factors and grades are determined chiefly by total damage. It is thus apparent that the grades of June receipts give in general a reliable index of the amount of ear rots in that portion of the corn crop of the preceding summer which reaches market during that period, and to that extent at least a fair cross section of the crop as a whole. An exception to this is probably found in the 1917 crop which was damaged chiefly by early frost.

Variations in Losses from Corn Ear Rots

Figure 3 gives the percentage of cars inspected at all the markets listed which showed the indicated per cent of total damage in June following the year the crop was harvested. The crops of 1917 and 1926 have conspicuously high percentages of damage. Nineteen twenty-two has the lowest amount of damage on the chart. Since 1928 the crops have been consistently of relatively high quality with a slight increase in rot in 1932. As might be expected from the preeminence of Iowa as a corn-producing state, the trend for Iowa (Figure 4) follows in general that of the corn-producing areas as a whole, perhaps the most marked divergences being in 1921, 1930, and 1933, when the Iowa crop was conspicuously better than the average, and in 1931 and 1932, when it was conspicuously below the average.

The variations between the individual producing areas and the yearly fluctuation in quantity of corn received at a single terminal may be readily traced by a comparison of the various maps (Figs. 5 to 40). The data thus presented should form the basis for a reasonably adequate "history" of the incidence of corn ear rots in the corn belt during nearly two decades. For greatest usefulness the more conspicuous fluctuations in amount of ear rots should be correlated, so far as possible, with environmental phenomena which might be considered causal.

In some cases, the cause for the crop of a particular year or region being especially good or especially poor is well known. For instance, the generally poor crop of 1917 was undoubtedly due to an early frost. In many other cases, an equally close relation may be well known to students of local conditions, without having been commented on in any publication.

Before attempting even a general analysis of the relation between the fluctuations in the amount of ear rot and environmental conditions, it seems desirable to try to draw on the large amount of information extant among those familiar with corn conditions all over the country. The material presented herewith is distributed in a frank endeavor to obtain more information and suggestions from those familiar with corn in the field and on the market. The writer is seriously interested in studying the relation between these ear rots and weather and other environmental conditions, and will appreciate assistance from other workers.

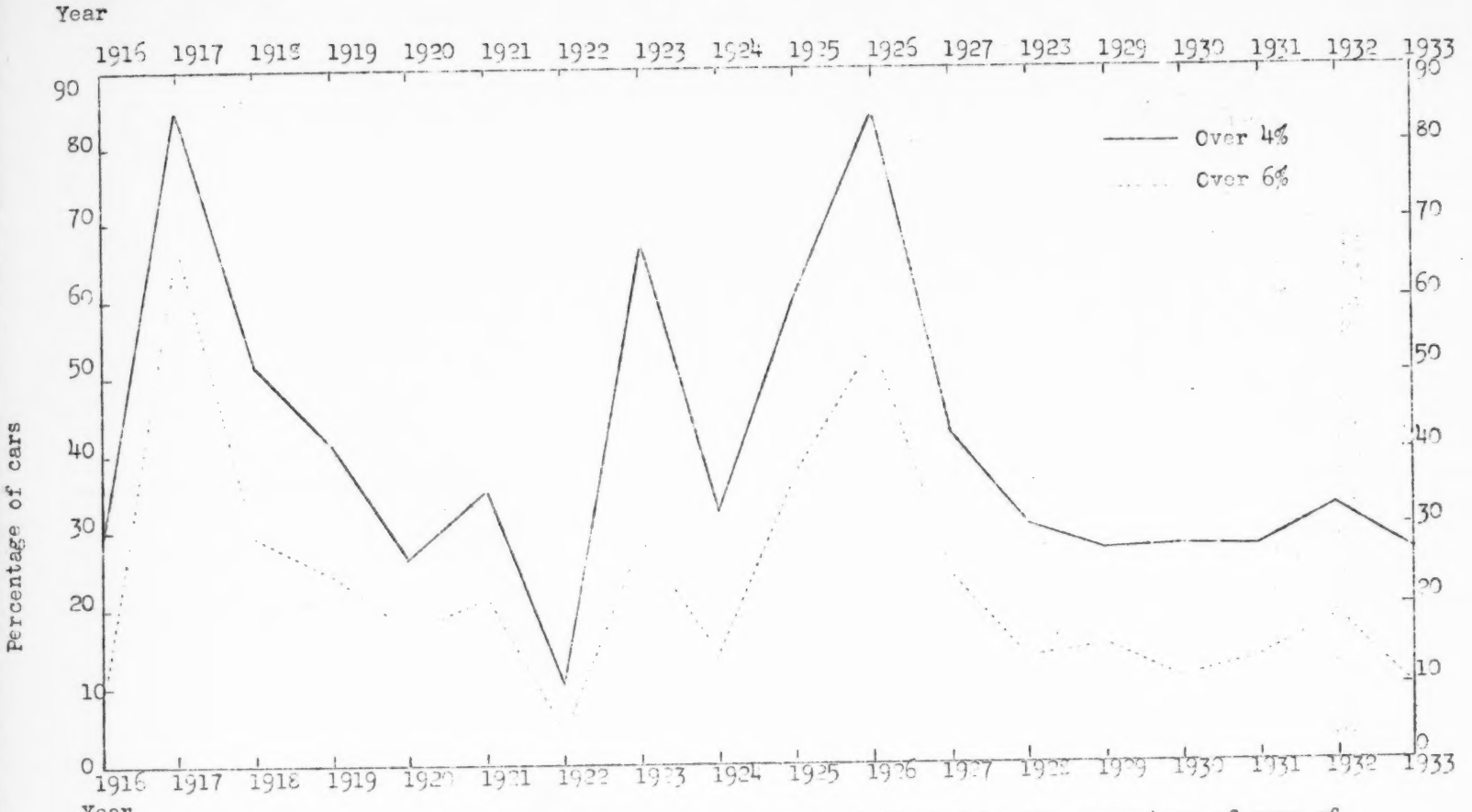


Fig. 3. Incidence of corn ear rots in the various crops as indicated by the percentage of cars of shelled corn received at terminals listed in the text showing over 4 per cent total damage in June of the following year

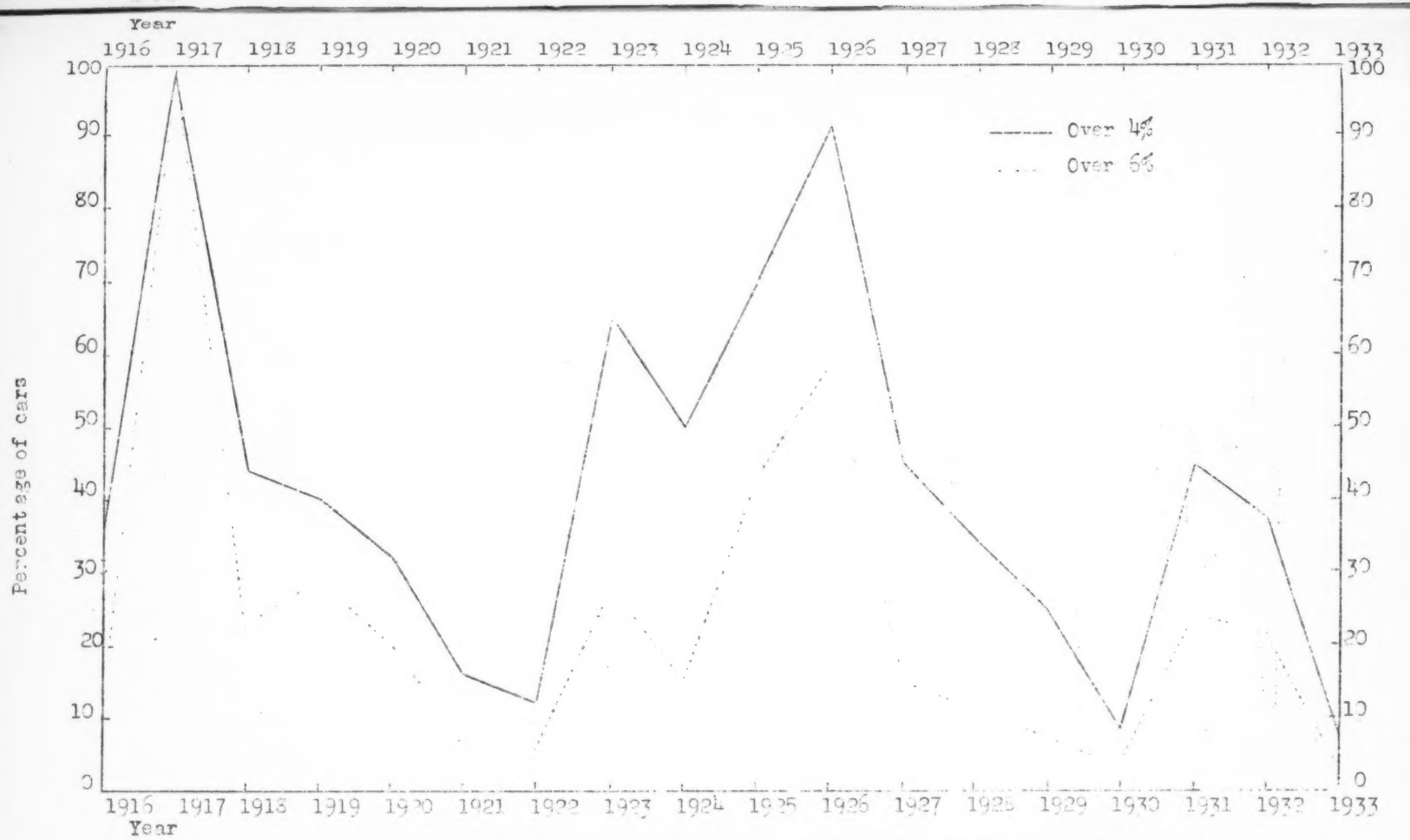


Fig. 4. Incidence of corn ear rots in the various crops as indicated by the percentage of cars of shelled corn received at Iowa terminals showing over 4 per cent total damage in June of the following year

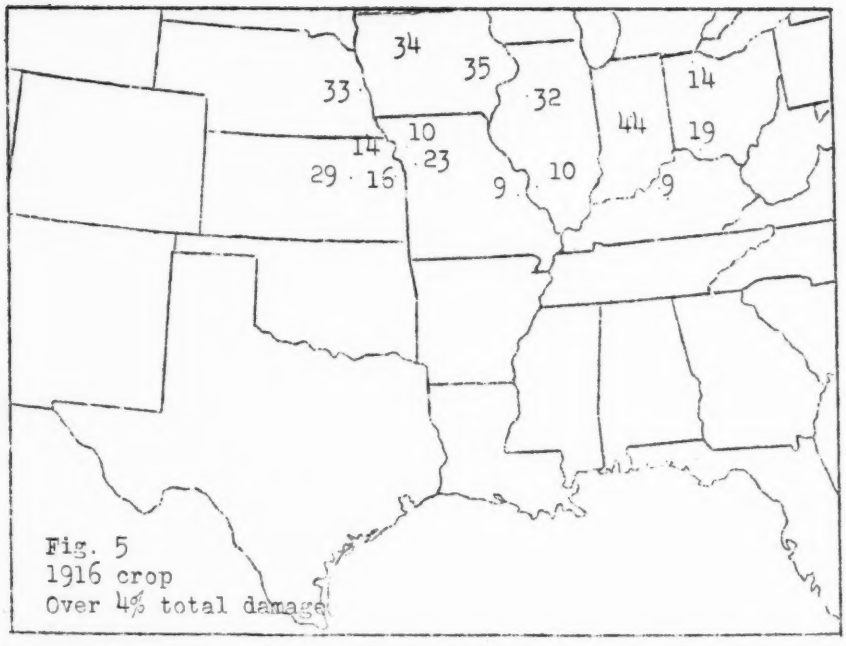


Fig. 5
1916 crop
Over 4% total damage

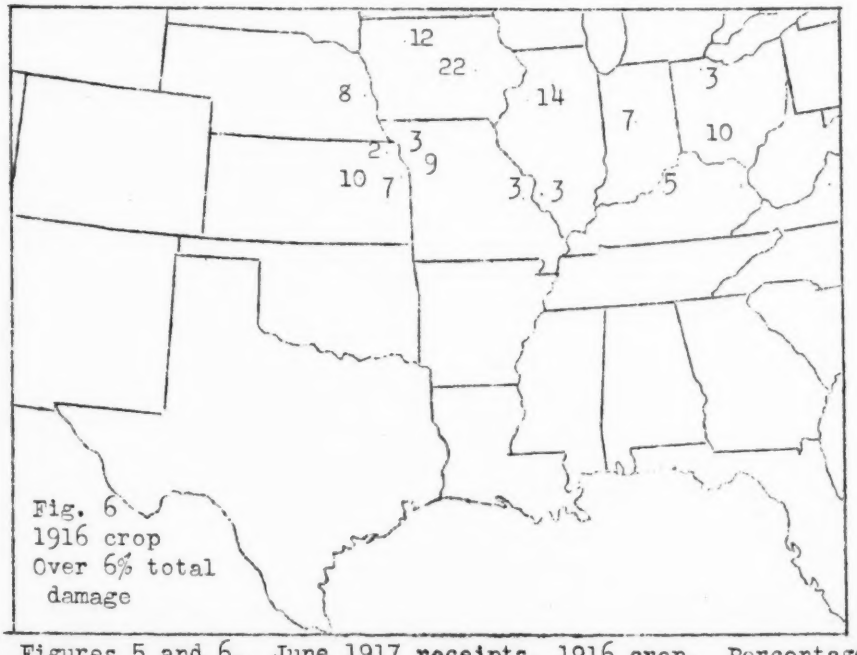
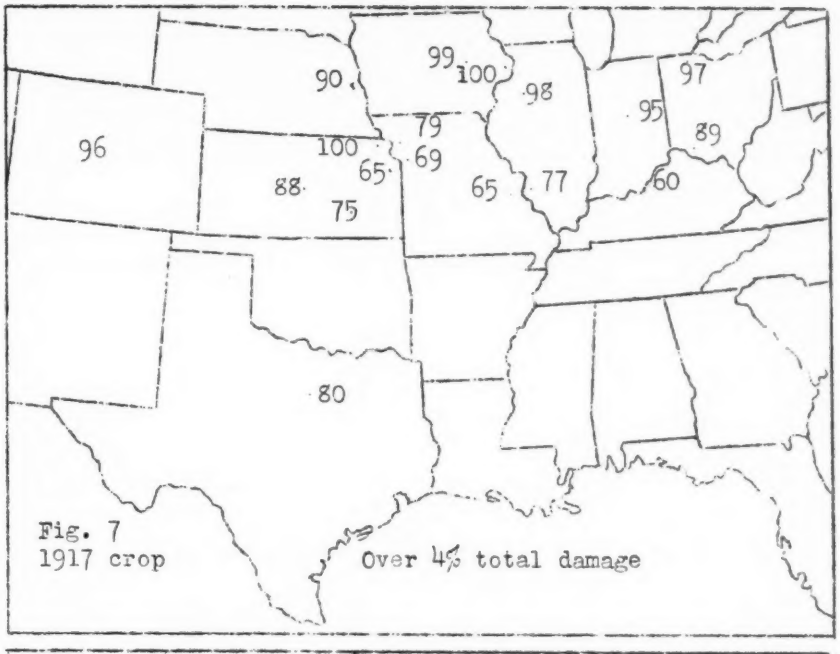
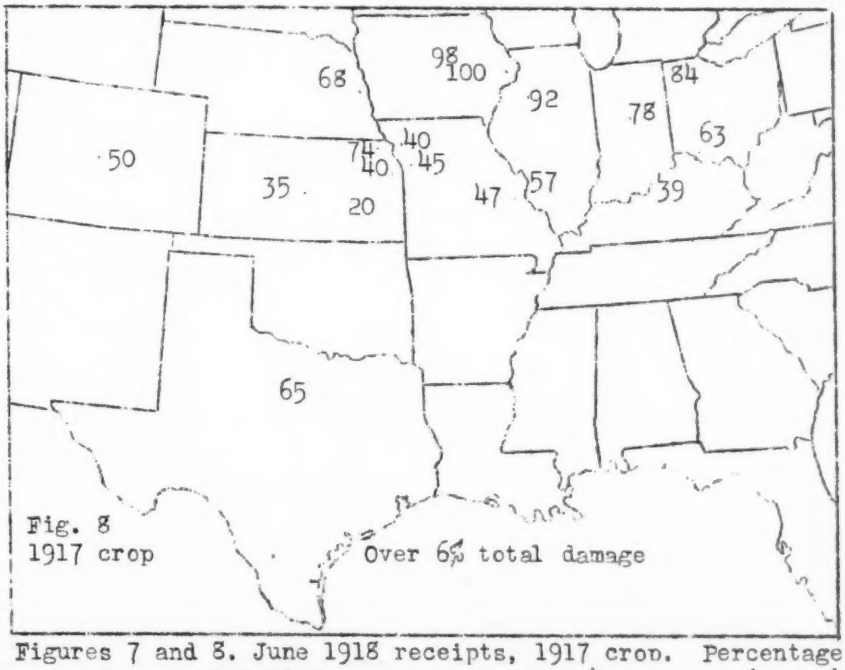


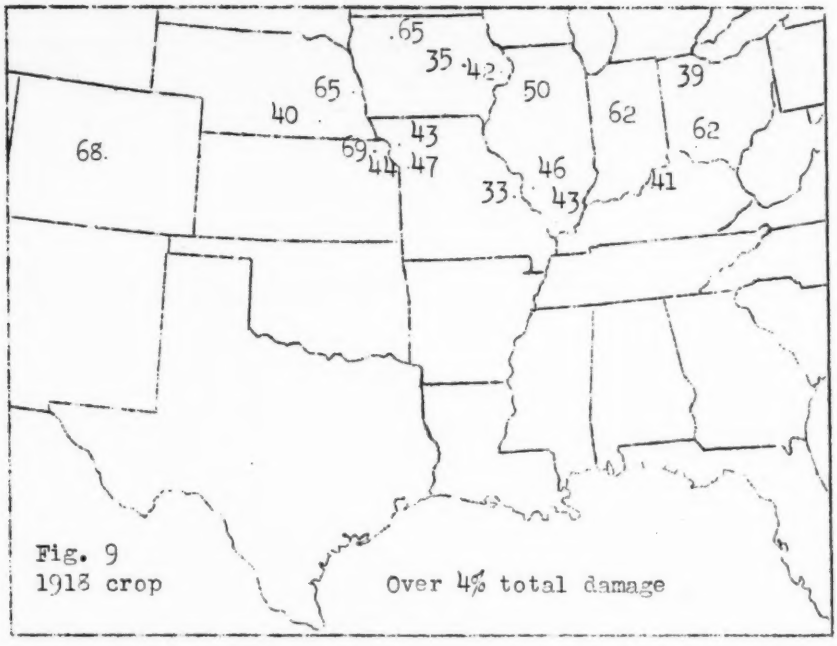
Fig. 6
1916 crop
Over 6% total
damage

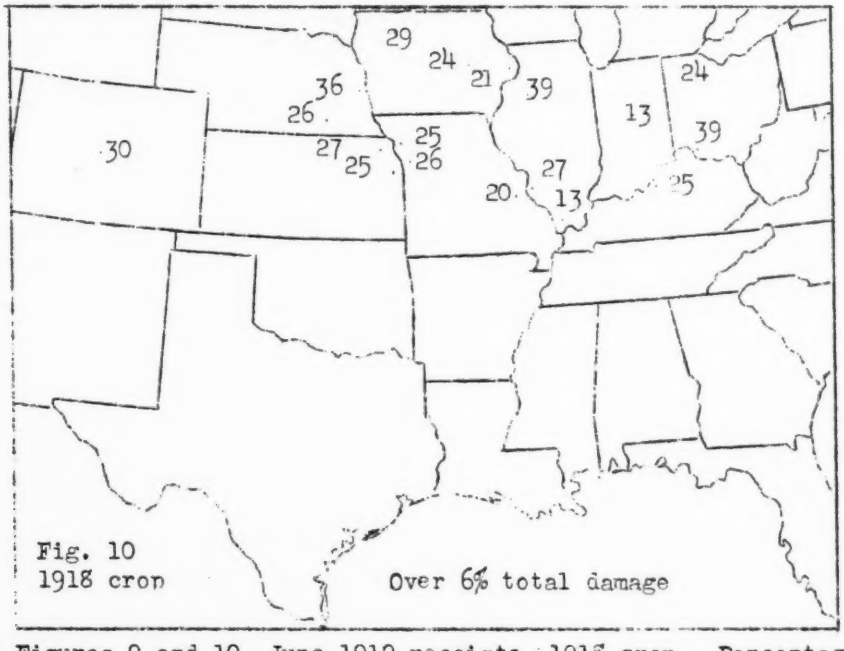
Figures 5 and 6. June 1917 receipts, 1916 crop. Percentage of cars of shelled corn showing over 4 per cent(upper) and over 6 per cent (lower) total damage



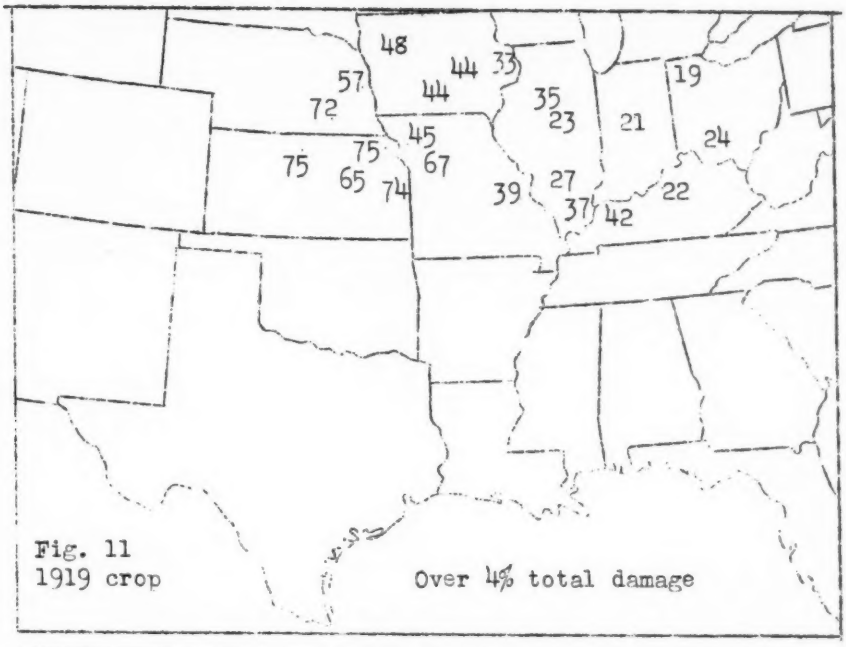


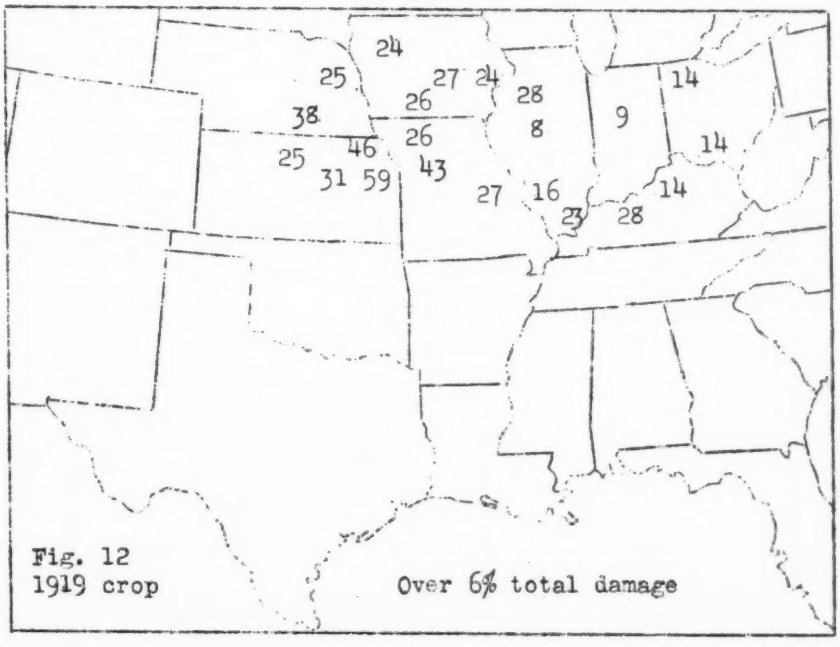
Figures 7 and 8. June 1918 receipts, 1917 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



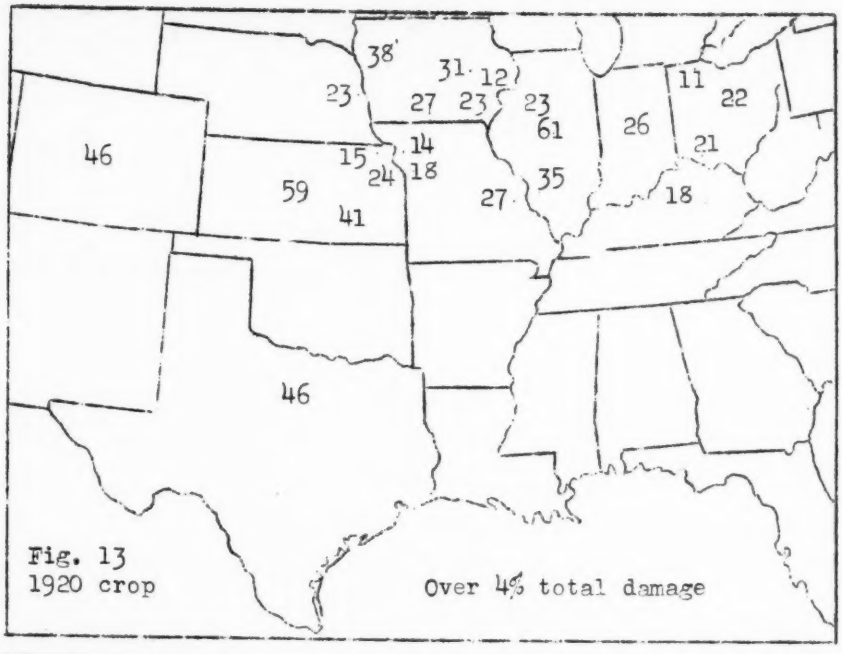


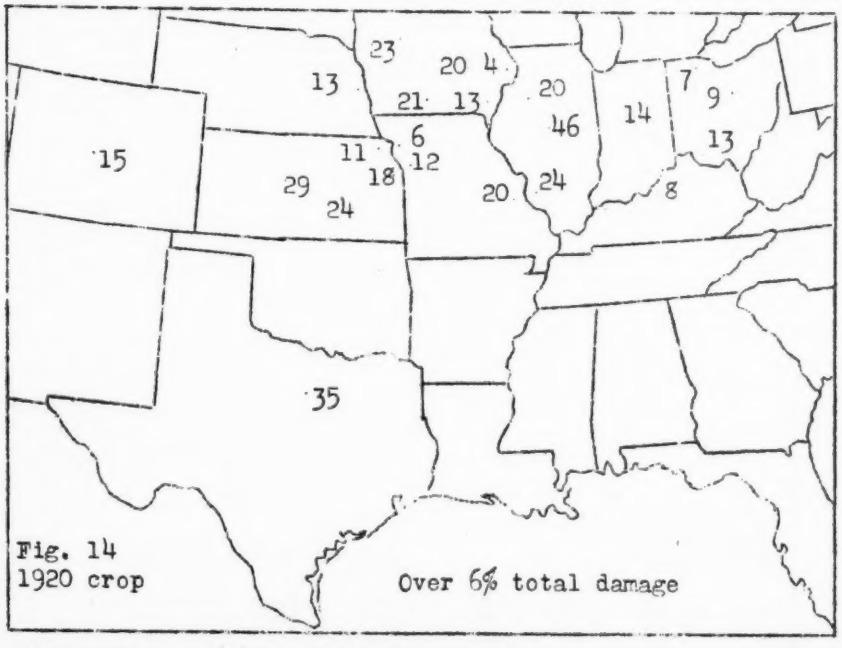
Figures 9 and 10. June 1919 receipts, 1918 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



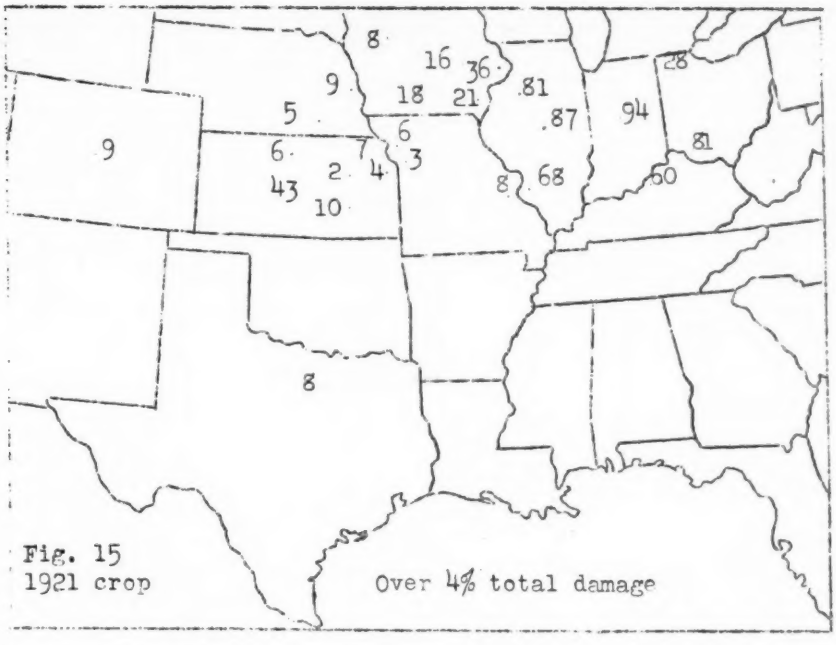


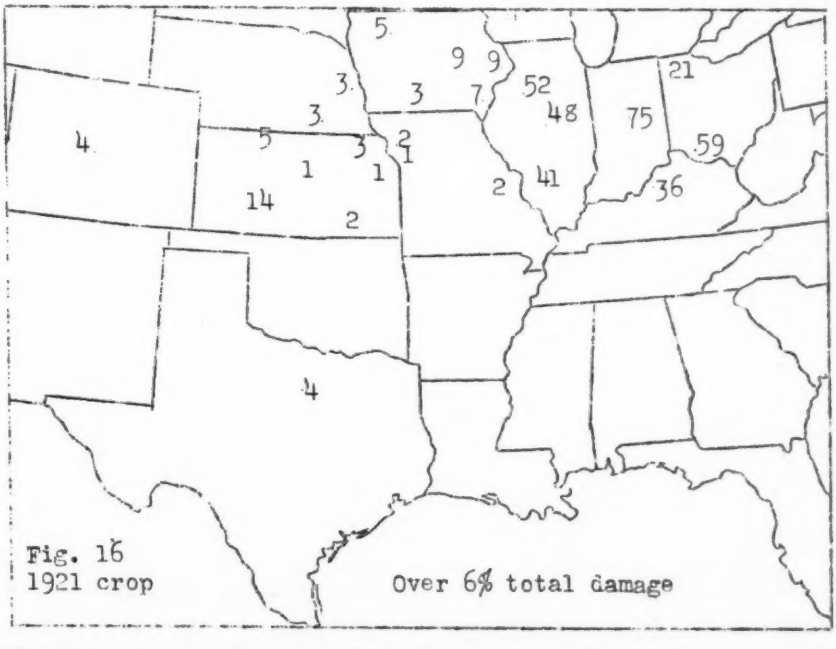
Figures 11 and 12. June 1920 receipts, 1919 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



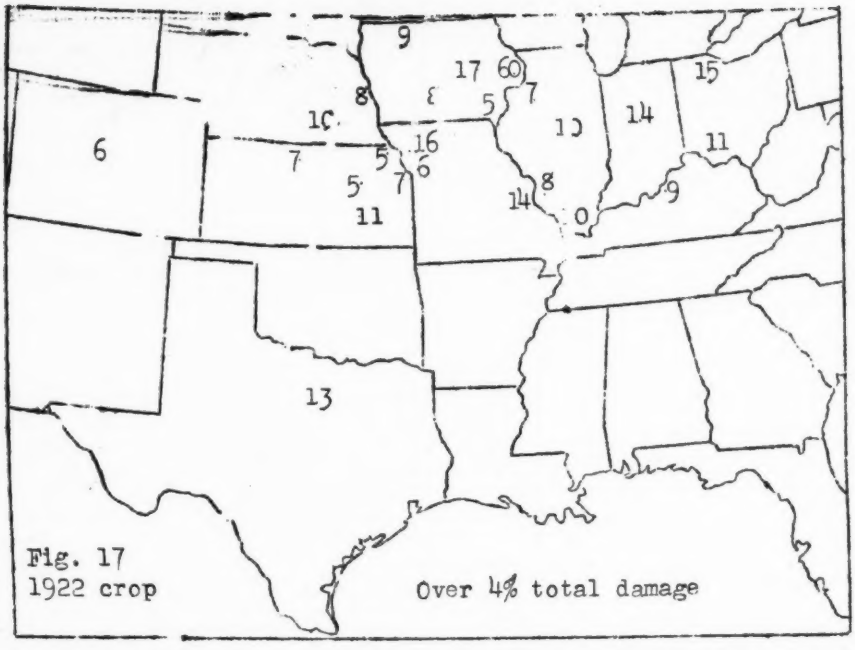


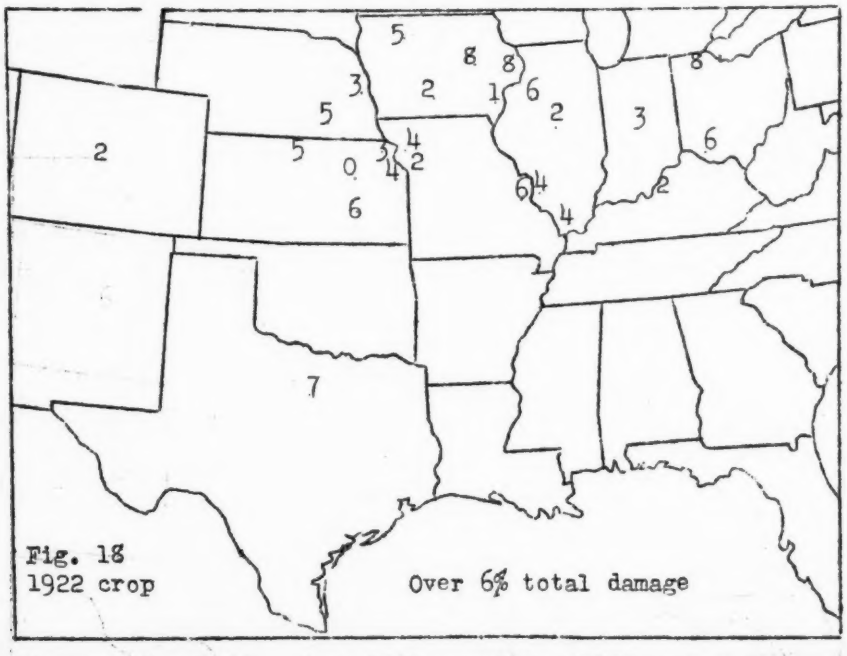
Figures 13 and 14. June 1921 receipts, 1920 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



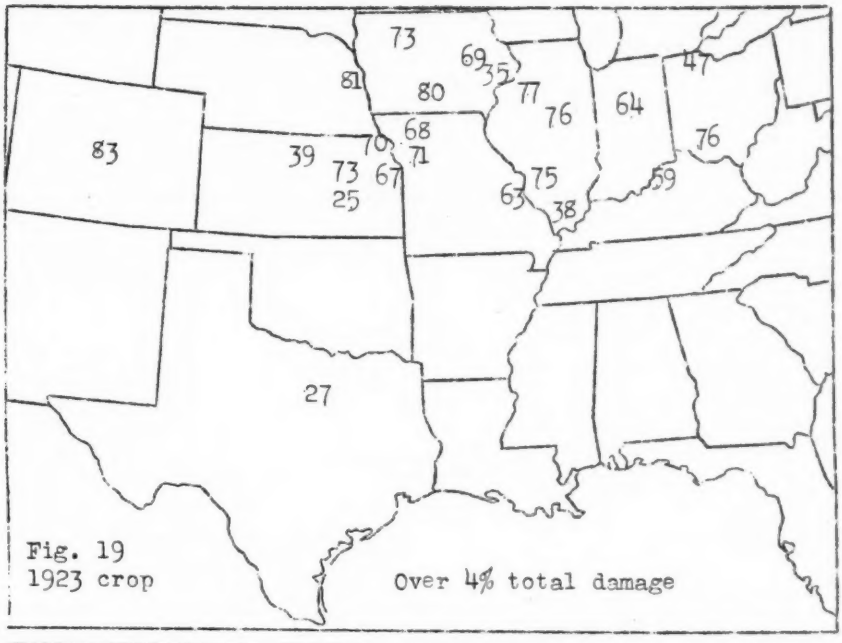


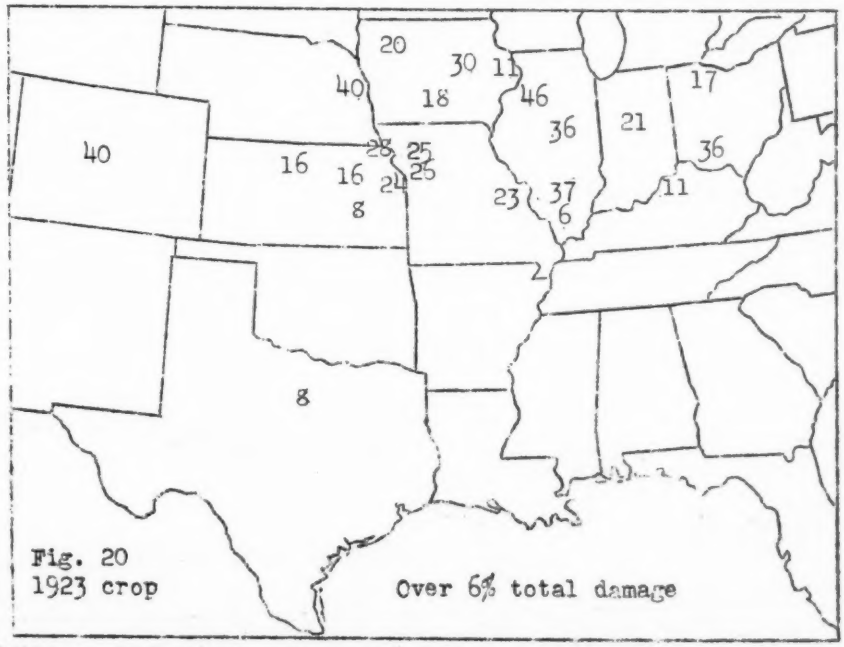
Figures 15 and 16. June 1922 receipts, 1921 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



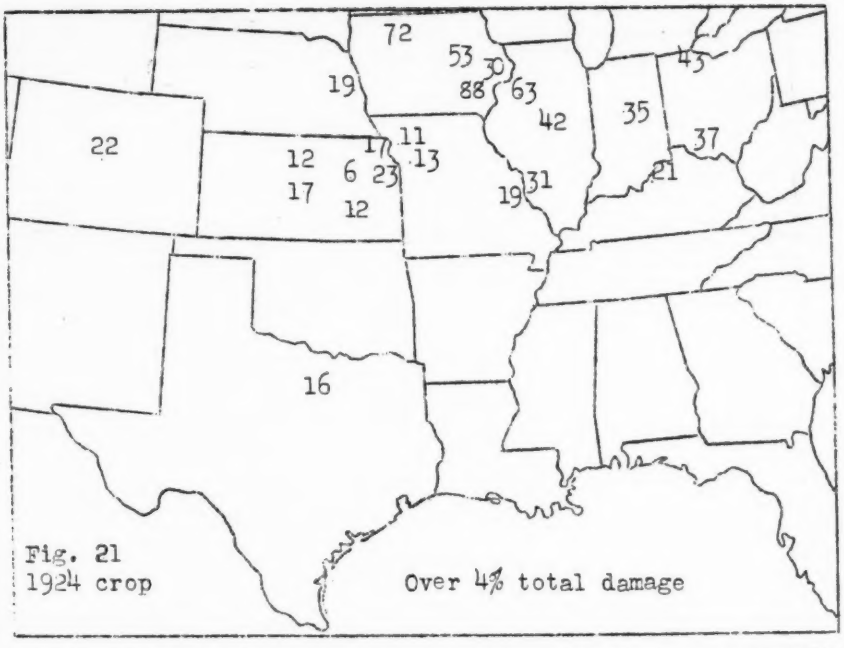


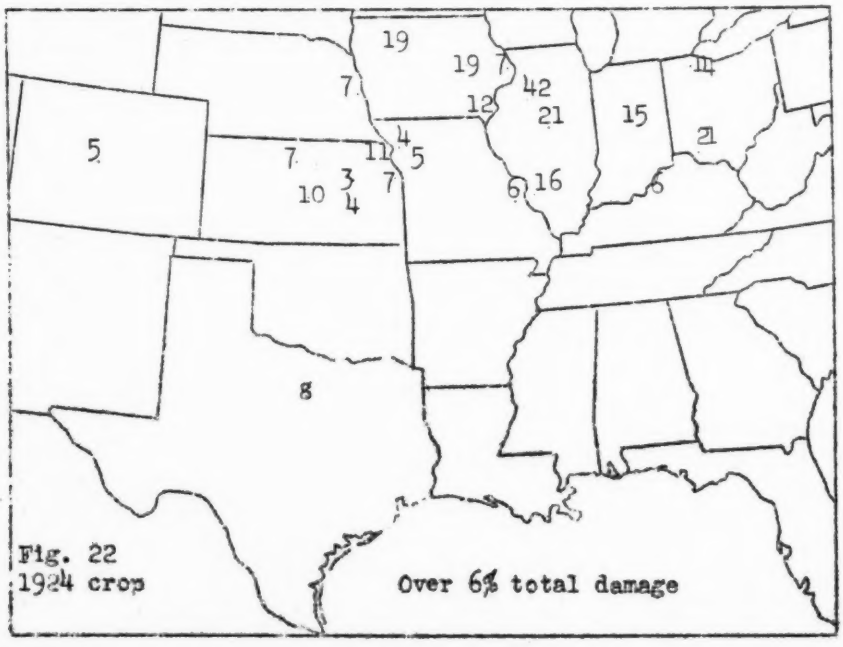
Figures 17 and 18. June 1923 receipts, 1922 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



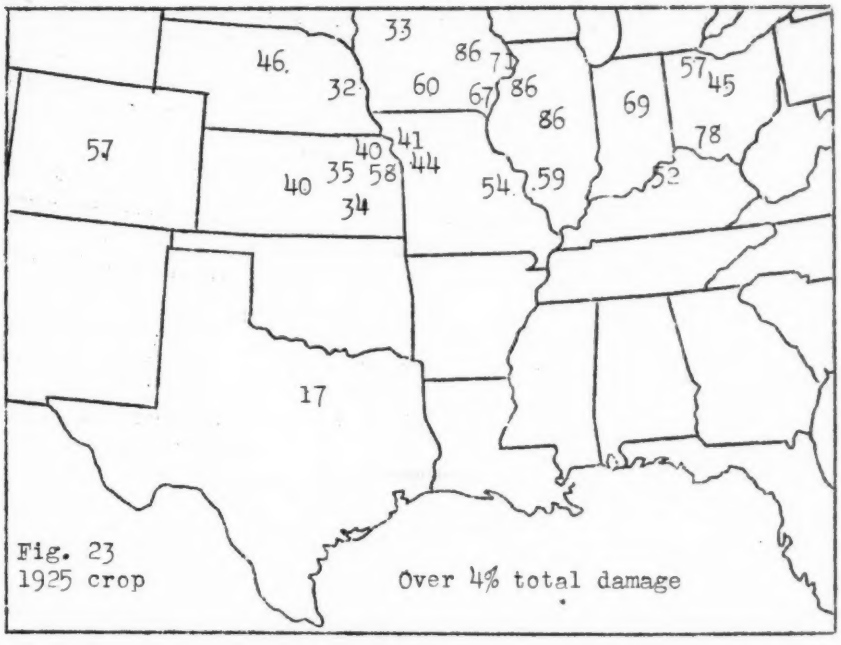


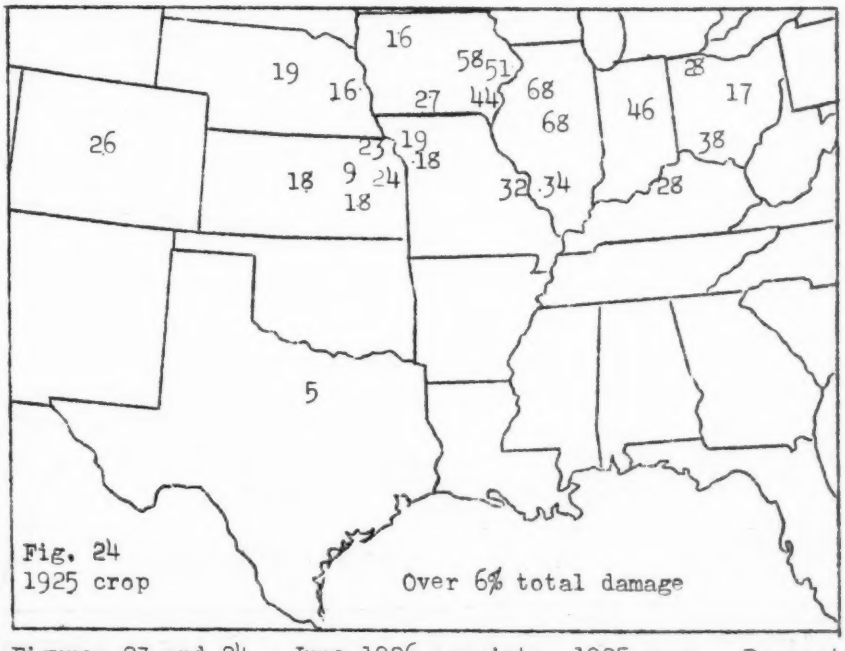
Figures 19 and 20. June 1924 receipts, 1923 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



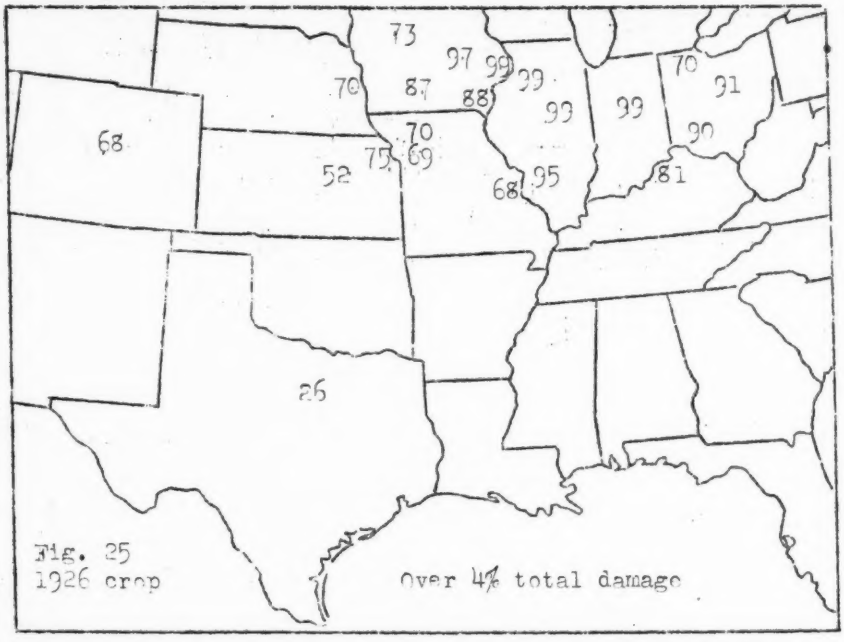


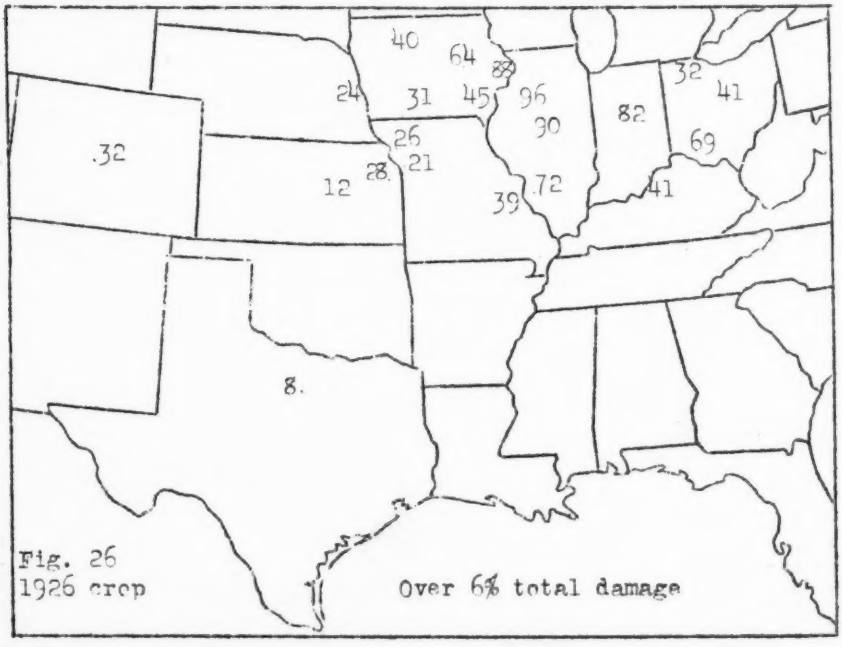
Figures 21 and 22. June 1925 receipts, 1924 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



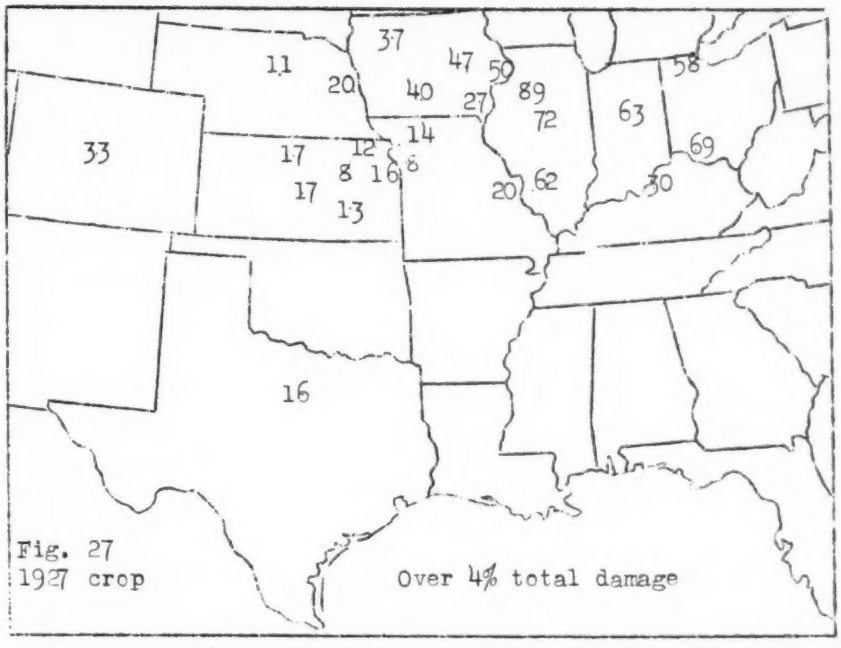


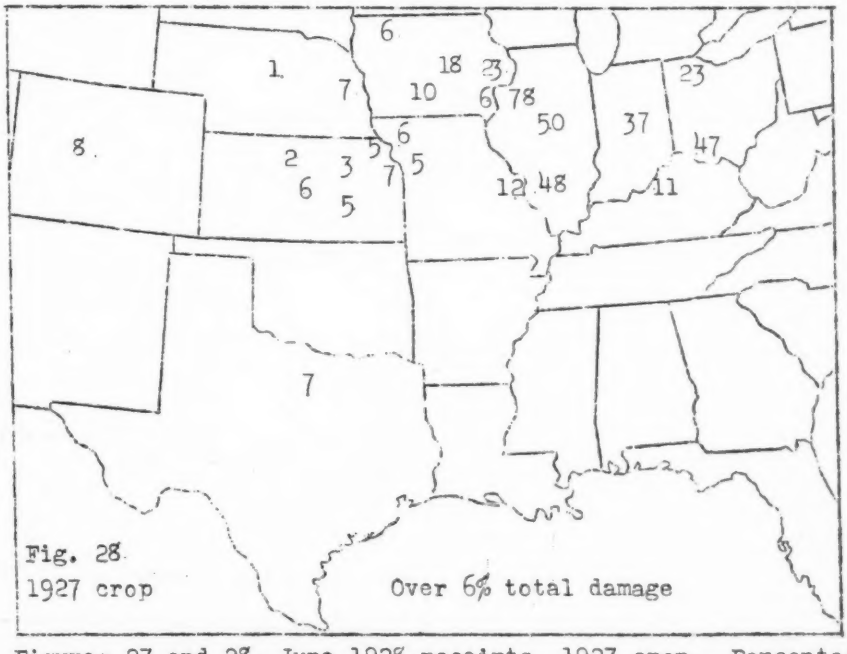
Figures 23 and 24. June 1926 receipts, 1925 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



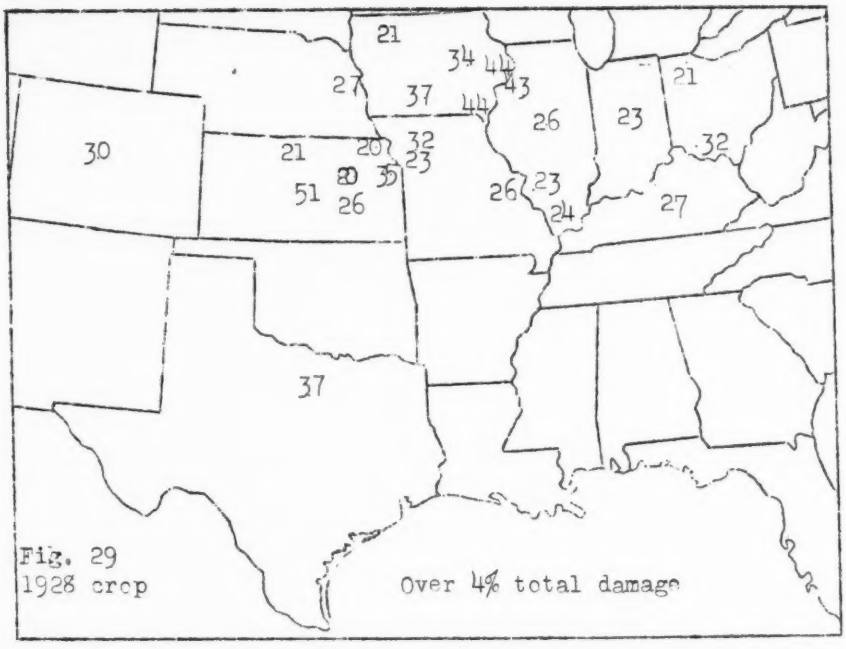


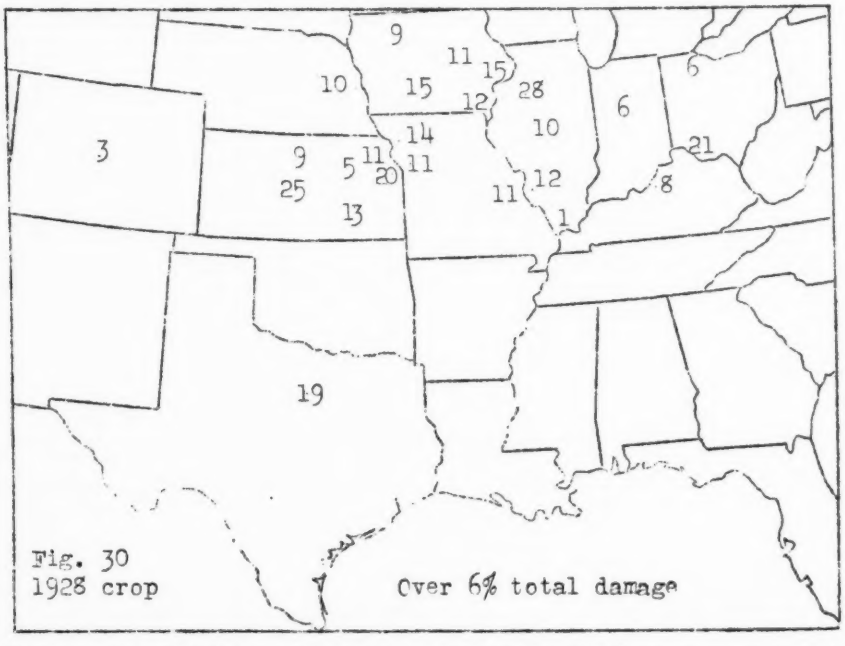
Figures 25 and 26. June 1927 receipts, 1926 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



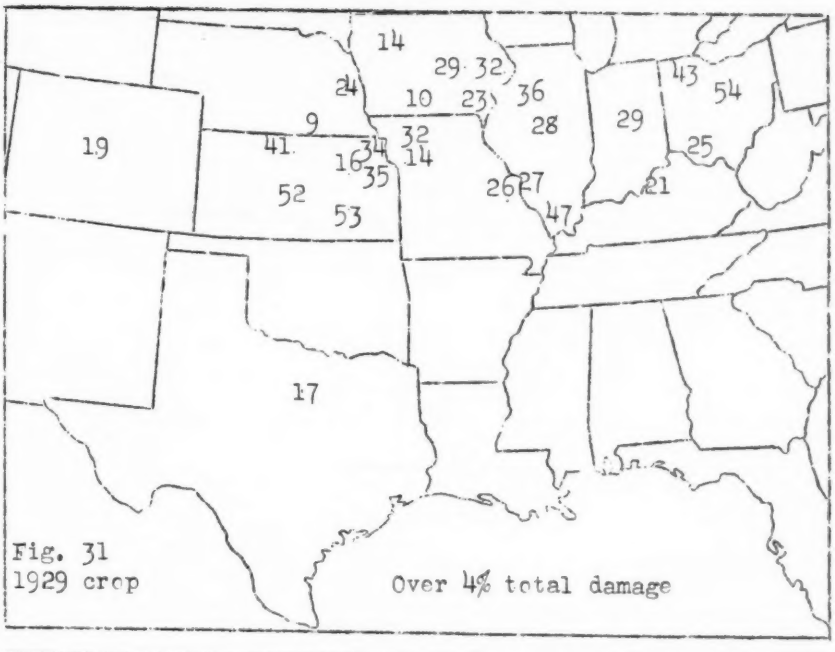


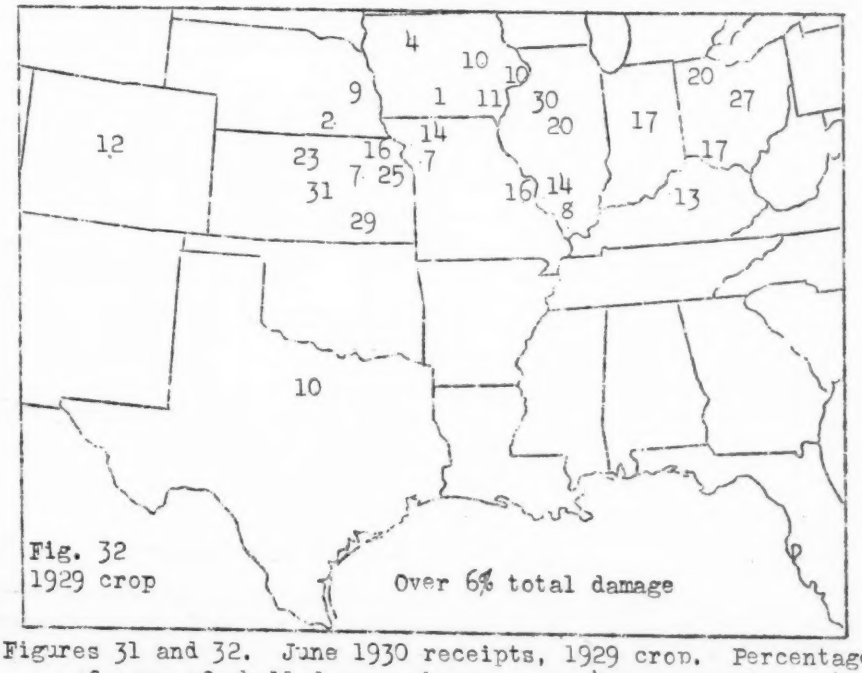
Figures 27 and 28. June 1928 receipts, 1927 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



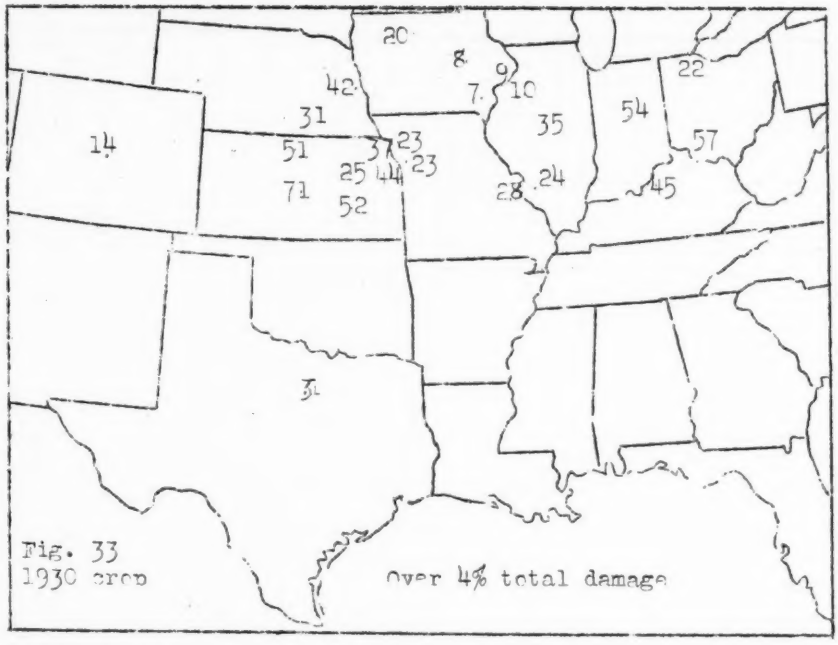


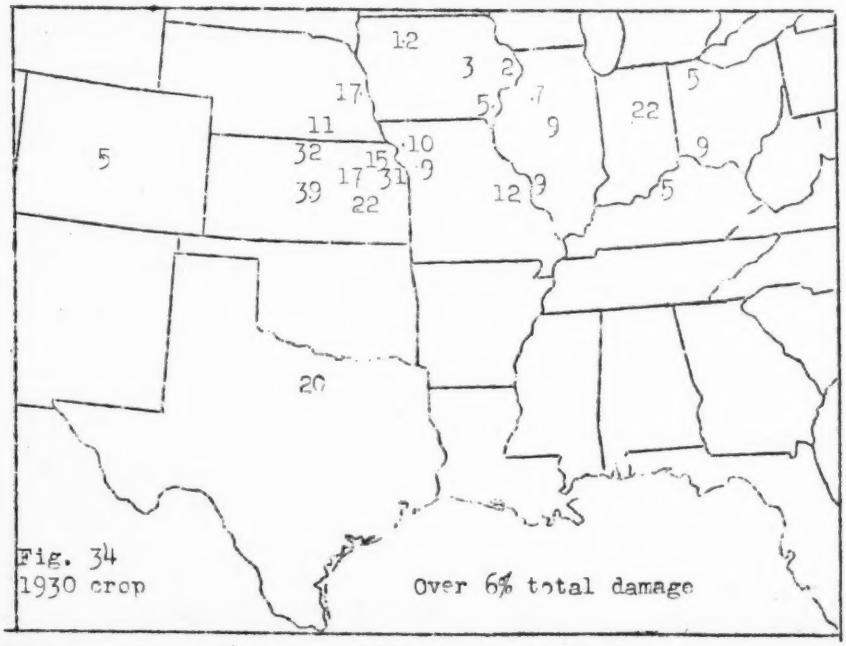
Figures 29 and 30. June 1929 receipts, 1928 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



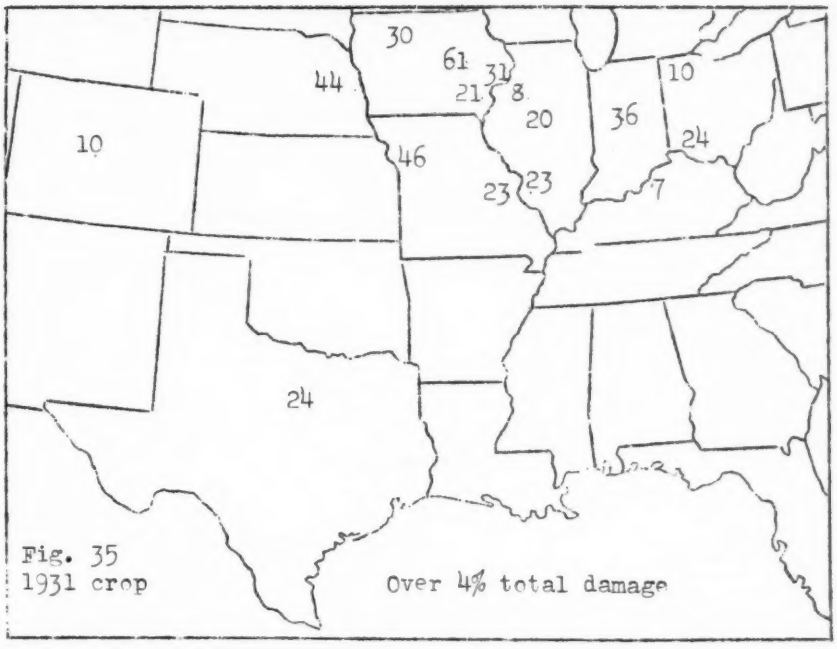


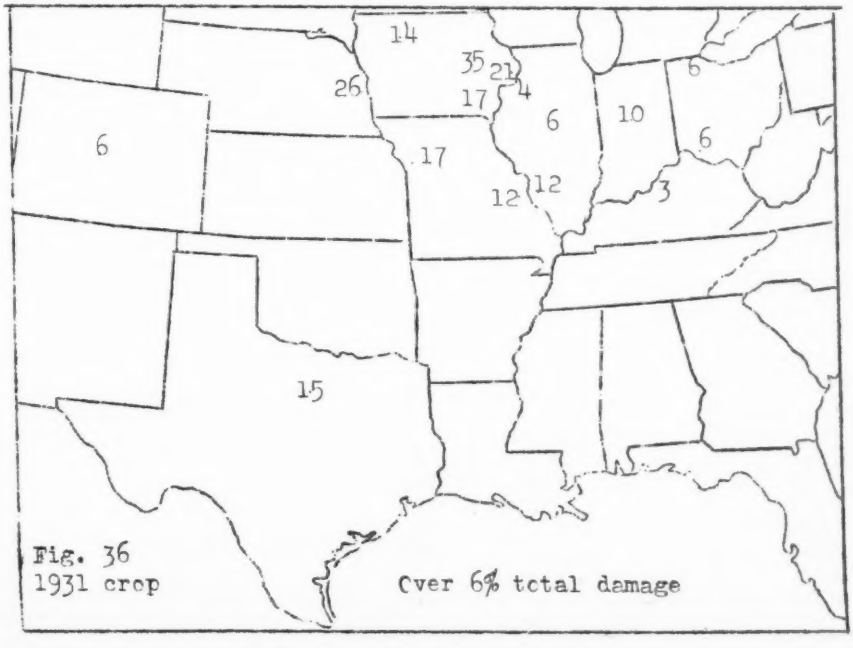
Figures 31 and 32. June 1930 receipts, 1929 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



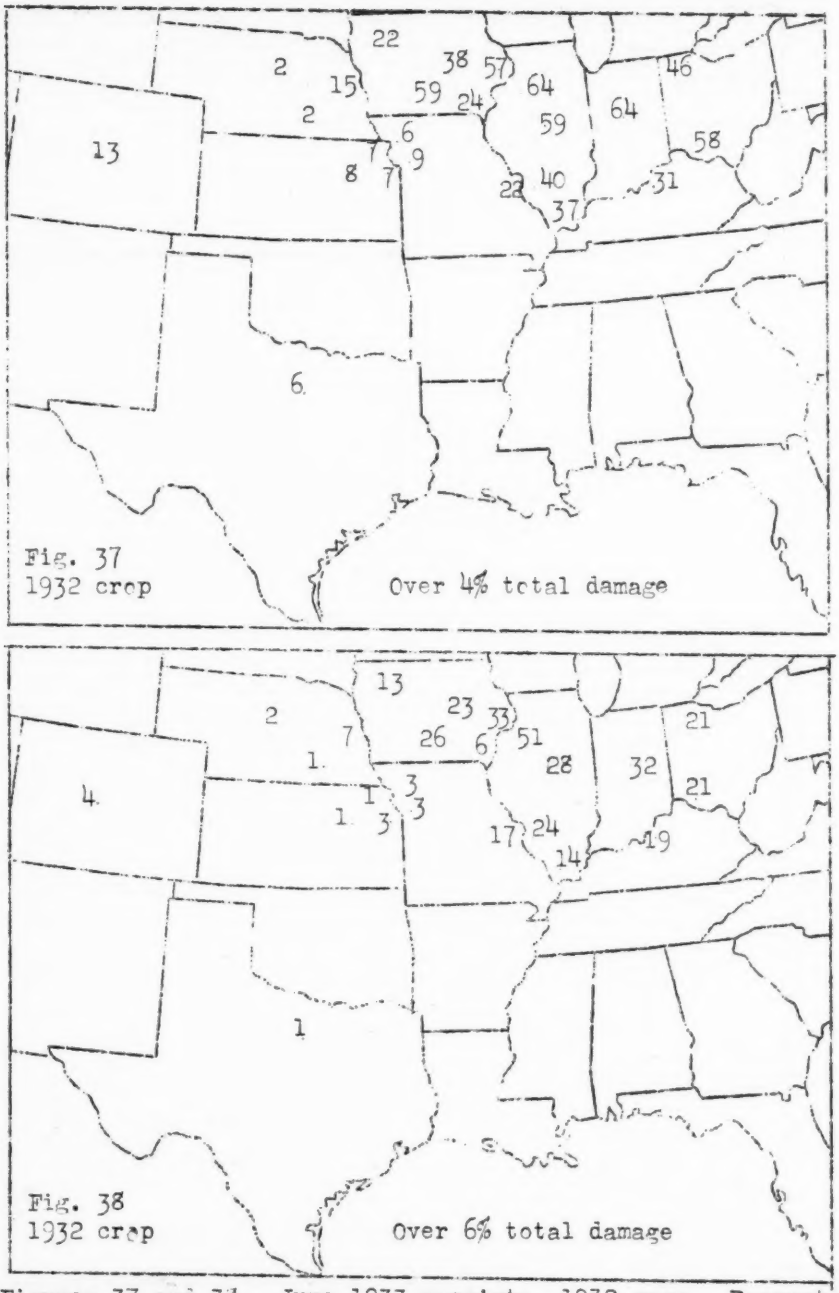


Figures 33 and 34. June 1931 receipts, 1930 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage

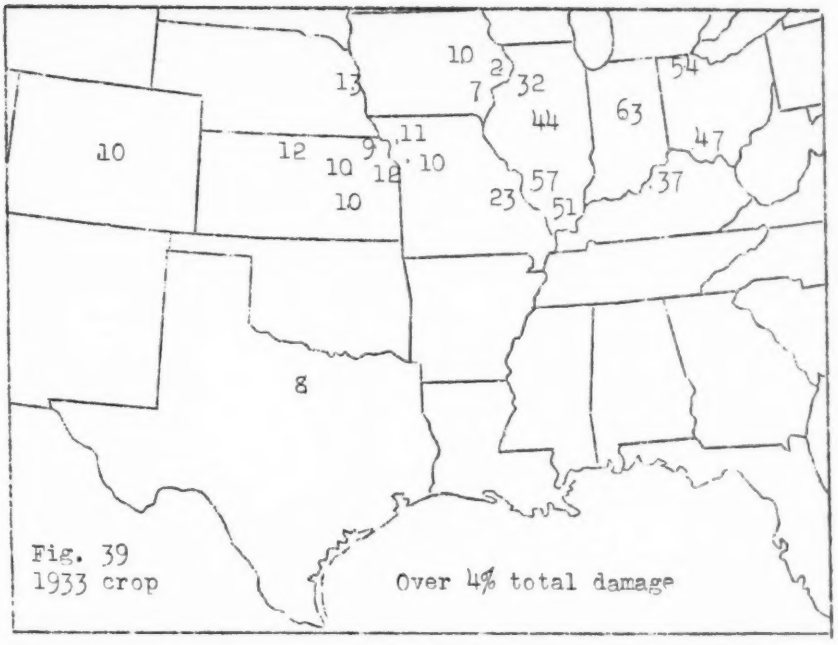


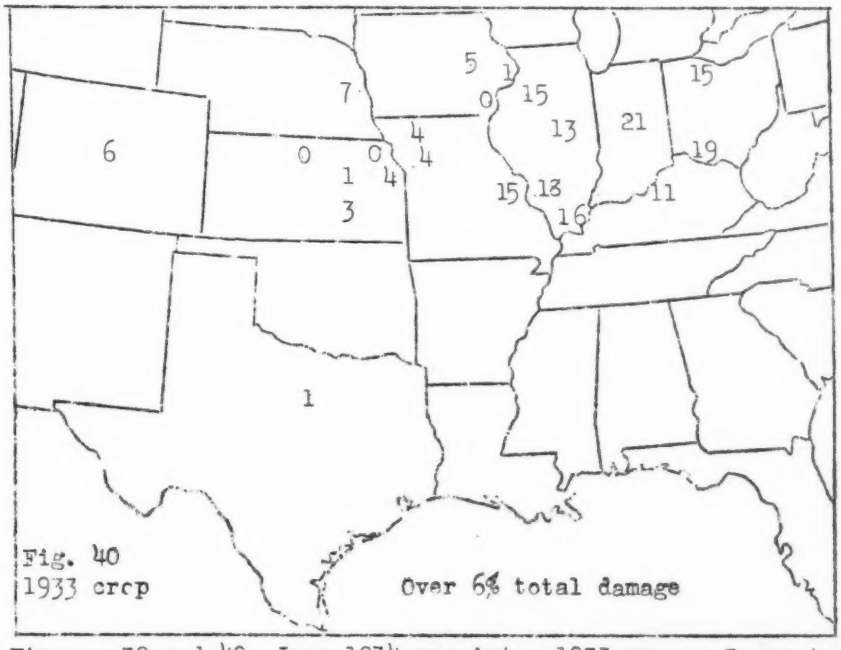


Figures 35 and 36. June 1932 receipts, 1931 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage



Figures 37 and 38. June 1933 receipts, 1932 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage





Figures 39 and 40. June 1934 receipts, 1933 crop. Percentage of cars of shelled corn showing over 4 per cent (upper) and over 6 per cent (lower) total damage